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AMENDED CLAIMS

1. Simulation process of a radiofrequency scenario starting from generation of serial messages including useful information (SIM_D, BT_SIM, SIM_DEL) for obtaining a phase-modulated radiofrequency test signal comprehensive of the most relevant channel impairments, including co-channel interference, which is sent to the input of a receiver under test (DUT) whose output is monitored, **characterized in that** includes the following further phases piloted by the message contents:

- execution of N×P digital modulation of a base band carrier, for obtaining P groups (carrier 1, ..., carrier M) of N base band isofrequential digital replicas of said phase-modulated carrier, being P chosen from 1 to the maximum number M of modulated carriers fitting the assigned band of the receiver under test (DUT), and N being the number of independent inputs of said receiver;
- digital multiplication, for every P groups of N replicas, of each base band replica by a respective complex constant (SIM_BEAM_W1, SIM_BEAM_W2, ..., SIM_BEAM_WN) assigned to the group, being the numerical order of the replicas and the phases of the multiplicative constants both increasing gradually in the successive products for beamforming each of the P group of N replicas according to an its own desired arrival direction to simulate;
- adjustment of the power level of each P group of N replicas;
- digital multiplication of each beamformed group of N replicas by a relevant digital intermediate frequency carrier (SIM_NCO) which carries out frequency conversion of the group at a respective intermediate frequency, so establishing for each intermediate frequency converted beamformed group ($C1_1$, $C1_2$, ..., $C1_N$; .... ; CM_1, CM_2, ..., CM_N) the relative position inside the broad band of the receiver under test;
- summation of all the P intermediate frequency converted replicas having the same order in each beamformed group, for obtaining N broad band intermediate frequency replicas (IF1, IF2, ..., IFN);
- analogue conversion of the N broad band intermediate frequency replicas (IF1, IF2, ..., IFN) and filtering broad band the analogue replicas for reconstruction;
- radiofrequency conversion of the reconstructed analogue replicas, amplifying and filtering they for obtaining N broad band radiofrequency replicas (RF1, RF2, ..., RFN) constituting a single test signal suitable for testing the operation of a

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directional receiver, preferably one included in a base station of a radiomobile system designed for cooperating with a N-elements directive array:

- application of the N broad band radiofrequency replicas (RF1, RF2, ..., RFN) directly to N radiofrequency inputs (in1, in2, ..., inN) of the receiver under test (DUT), bypassing the antenna.

2. Simulation process of radiofrequency scenario according to claim 1, characterized in that the content of said serial messages (SIM_D, SIM_PN, SIM_DEL, SIM_BEAM_W1, ..., SIM_BEAM_WN, SIM_NCO, OL) is read from general tables (TAB.1, TAB.2, ..., TABK) of parameters and options defining a scenario concerning at least one useful transmission signal and one or more isofrequential interferent signals, having simulated arrival directions generally different from those of said relevant useful signals.

3. Simulation process according to claim 2, characterized in that said general tables (TAB.1, TAB.2, ..., TABK) constitute a sequence of K tables cyclically read.

4. Simulation process according to claim 3, characterized in that its operative phases form a sequence repeated at time intervals of the same duration, using time by time said messages obtained converting a new general table of said cyclic sequence, thus giving dynamic and recurrent characteristics to said simulated scenario.

5. Simulation process according to claim 4, characterized in that said equal duration of the time intervals is such that the variation speed of the contents of said messages is similar to the one that can be detected in the corresponding said parameters of a real scenario.

6. Simulation process according to claim 5, characterized in that said duration is equal to, or lower than 4.61 ms.

7. Simulation process according to ~~any~~ claim 4 ~~through 6~~, characterized in that said general tables (TAB.1, TAB.2, ..., TABK) are updated during the testing time, and corresponding updated messages are generated in synchronous mode compared to said sequential time intervals.

8. Simulation process according to claim 4, characterized in that it includes an additional acquisition phase of the results of said testing, in asynchronous mode compared to said sequential time intervals.

9. Simulation process according to ~~any~~ claim ~~from~~ 2 ~~to 8~~ characterized in that the selection of some of said options of said general tables (TAB.1, TAB.2, ..., TABK) involves the compilation of relevant sub-tables containing additional parameters to select for the specified option.

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10. Simulation process according to ~~any~~ claim ~~from~~ 4 ~~to 9~~, characterized in that said carriers are time division multiplexed, and each of said sequential time intervals of the same duration corresponds to a frame time.

11. Simulation process according to ~~any~~ claim ~~from~~ 2 ~~to 10~~, characterized in that said general tables (TAB.1, TAB.2, ..., TABK) include also parameters that take into account the presence of noise, the doppler effect due to the speed of the mobiles, and the quick and sudden fading of the electromagnetic field received, caused by multiple paths destructive interference or by masking by obstacles encountered by mobiles in movement.

12. Testing system of a radiofrequency receiver, including a control processor (CNTR_PC) for generating serial messages directed to orthogonal modulation and frequency conversion devices controlled by the content of said messages for generating a phase-modulated radiofrequency test signal comprehensive of the most relevant channel impairments, including co-channel interference which is sent to the input of a receiver under test (DUT) whose output is monitored, **characterized in that** it further includes:

- N×P digital modulators (GMSK1, GMSK2, ..., GMSKN) of a self-generated base band carrier, for obtaining P groups (carrier 1, ..., carrier M) of N base band isofrequential digital replicas of said phase-modulated carrier, being P chosen from 1 to the maximum number M of modulated carriers fitting the assigned band of the receiver under test (DUT), and N being the number of independent inputs of said receiver;
- N×P first digital multipliers (M1, M2, ..., MN; ...) arranged for multiplying, for every P groups of N replicas, each base band replica by a respective complex constant (SIM_BEAM_W1, SIM_BEAM_W2, ..., SIM_BEAM_WN) assigned to the group, being the numerical order of the replicas and the phases of the multiplicative constants both increasing gradually in the successive products for beamforming each of the P group of N replicas according to an its own desired arrival direction to simulate;
- means for adjusting the power level of each P group of N replicas;
- N×P second digital multipliers (MM1, MM2, ..., MMN; ....) for multiplying each beamformed group of N replicas by a relevant digital intermediate frequency carrier (SIM_NCO, ...) which carries out frequency conversion of the group at a respective intermediate frequency, so establishing for each intermediate frequency converted

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beamformed group ($C1_1$, $C1_2$, ..., $C1_N$; .... ; CM_1, CM_2, ..., CM_N) the relative position inside the broad band of the receiver under test;

- N digital adding means (1, 2, ..., N) for summing up all the P intermediate frequency converted replicas having the same order in each beamformed group, for obtaining N broad band intermediate frequency replicas (IF1, IF2, ..., IFN);
- N digital/analogue conversion means (D/A) of said N broad band intermediate frequency replicas (IF1, IF2, ..., IFN) followed by broad band filtering means for reconstructing the analogue replicas;
- N radiofrequency mixers (MX1, MX2, ..., MXN) of said N broad band reconstructed analogue replicas (IF1, IF2, ..., IFN) for obtaining N broad band radiofrequency replicas (RF1, RF2, ..., RFN);
- N radiofrequency amplifiers (PA1, PA2, ..., PAN) for amplifying said radiofrequency replicas (RF1, RF2, ..., RFN) and orderly sent them to N radiofrequency outputs (out1, out,2, ..., outN) of the testing system, where the radiofrequency replicas constitute a single test signal suitable for testing the operation of a directional receiver, preferably one included in a base station of a radiomobile system designed for cooperating with a N-elements directive array;
- a whole of N coaxial cables or equivalent means, connecting said N radiofrequency outputs to a same number of inputs (in1, in2, ..., inN) of a said receiver (DUT), without antenna.

13. Testing system according to claim 12, characterized in that the intermediate frequency converted beamformed groups ($C1_1$, $C1_2$, ..., $C1_N$; .... ; CM_1, CM_2, ..., CM_N), each of N replicas, are generated by means of P identical digital modules (TX_PROC1, ..., TX_PROCM), each including a dedicated processor interface (INTF_PC) communicating with N digital modulators (GMSK1, GMSK2, ..., GMSKN), N first digital multipliers (M1, M2, ..., MN), and N second digital multipliers (MM1, MM2, ..., MMN); the whole digital modules being connected to N buses (BS1, BS2, ..., BSN) for transferring the N broad band intermediate frequency replicas (IF1, IF2, ..., IFN) towards as many digital to analogue converters (D/A), through a binary tree of N two-inputs digital adders (1, 2, ..., N).

14. Testing system according to claim 12 ~~or 13~~, characterized in that said control processor (CNTR_PC) transfers to said interface means (INTF_PC, LO_CORP) said control messages (SIM_D, SIM_BEAM_W1, SIM_BEAM_W2, ..., SIM_BEAM_WN SIM_NCO, OL) at sequential time intervals of identical duration.

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15. Testing system according to claim 14, characterized in that said identical duration of the sequential time intervals is such that the variation speed of the contents of said messages is similar to that which can be detected in corresponding parameters of a real scenario.

16. Testing system according to ~~any~~ claim ~~from~~ 12 ~~to 15~~, characterized in that said messages are obtained from the conversion of general tables (TAB.1, TAB.2, ..., TABK) of parameters and options defining a simulated scenario, stored into said control processor (CNTR_PC).

17. Testing system according to claim 16, characterized in that said general tables (TAB.1, TAB.2, ..., TABK) are organized in a sequence of K tables cyclically repeated.

18. Testing system according to claim 14, characterized in that said duration is equal to or lower than 4.61 ms.

19. Testing system according to ~~any~~ claim 16 ~~through 18~~, characterized in that said general tables (TAB.1, TAB.2, ..., TABK) are filled in before the testing and updated during the testing, and the corresponding updated messages are generated in synchronous mode compared to said sequential time intervals.

20. Testing system according to claim 12, characterized in that said carriers are time division multiplexed and said duration corresponds to a frame time.

21. Testing system according to ~~any~~ claim ~~from~~ 16 ~~to 20~~, characterized in that said general tables (TAB.1, TAB.2, ..., TABK) include also parameters to simulate the presence of noise, the doppler effect due to the speed of the mobiles, and the quick and sudden fadings of the electromagnetic field received, caused by destructive interference by multiple paths or by masking by obstacles encountered by the mobiles in movement.

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